

Kenneth A. Christiansen (1924–2017)

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One of the great speleobiologists and Collembola systematists, Ken Christiansen, died on November 26, 2017, at the age of 93. Ken was truly unique; no one who ever came in contact with him ever forgot him. A scholar and intellect of the first order, he always had time and enthusiasm for the work of his students and colleagues. His level of energy and enthusiasm was such that even into his 80's, his colleague and fellow collembologist Louis Deharveng called him “Hurricane Ken” after a visit to Louis at the Paris Museum of Natural History. He touched the lives of generations of students at Grinnell College and the lives of generations of Collembola taxonomists and speleobiologists throughout the world.

One of the most formative influences on Ken's life, surpassed only by his wife Phyllis and their four children, was his service in World War II in the U.S. Army Second Armored Infantry Division as a forward observer in the campaigns in Europe and North Africa. A genuine war hero and fierce anti-fascist, he was awarded a bronze star and an oak leaf cluster for bravery in combat. I once asked Ken what rank he achieved and he told me he was promoted to corporal three times! Anyone who believes the phrase that there are no atheists in a foxhole never met Ken and for many years he was famous at Grinnell for his atheism lecture.

Taking advantage of the GI Bill, Ken went to Boston University and Harvard University, and graduated with a Ph.D. from Harvard in 1951. His thesis (Christiansen 1958d) was on a rather large group of Collembola (the genus *Entomobrya*), large both in the sense of numbers of species and in terms of body size, reaching more than 1 mm in the Lilliputian Collembola world. His first job was at American University in Beirut, where he took advantage of his location to study the Collembola of Lebanon and Syria (Christiansen 1956c, 1957, 1958b). Sometime during his stay, probably in the summer of 1954, when he spent time in Switzerland with European collembologists Gisin and Delamare Deboutteville among others, he became interested in cave Collembola, of which there are many. Shortly after that he embarked on the study of adaptation in cave Collembola, especially the convergent evolution of antennal and appendage lengthening, as well as changes in claw structure. In 1955, he accepted a faculty position at Grinnell College in Iowa, where he stayed for the rest of his career.

While the winds of neo-Darwinism were blowing strongly in North America (especially at Harvard, the home institution of the great evolutionist Ernst Mayr), they were at best a faint breeze in continental Europe, the center of research on subterranean biology at the time. In a series of papers that continued for the next six decades (Christiansen 1960a, 1960b, 1965, 1982b, 1992a, 1995, 2003a, 2004, 2012; Christiansen and Culver 1968, 1969, Peck and Christiansen 1990), he offered what was really the first neo-Darwinian explanation for the morphological convergence of not only eye and pigment loss, but also appendage elongation and claw modification, of many lineages of cave Collembola. In 1962, he wrote his only paper in French (of course that is one more than any other cave biologist from the U.S.), coining a new term for the suite of evolutionarily convergent features found in cave organisms—troglomorphy (Christiansen 1962). This short paper, in an obscure journal, is a highly cited paper in cave biology, with over 100 citations. Together with Thomas Barr and Thomas Poulson, he established a North American school of subterranean biology, one with neo-Darwinism at its core. This was the first time since the 19th century that North Americans became a presence in the field. In the 19th century, neo-Lamarckians, especially A.S. Packard, brought North America to prominence in the field.

It was also in the 1960's that he initiated the study of the ecology of Hunters Cave in Iowa (Christiansen 1961b, Christiansen et al. 1961), one of the first ecological studies of a whole cave. Later on, he wrote another paper on cave ecosystems, this time with Michel Bouillon (Christiansen and Bouillon 1978) on caves in the Pyrenees. He spent two sabbatical leaves in 1962, 1967 and 1968 at the Laboratoire Souterrain in Moulis, France, then the leading research institution for subterranean biology. Until at least the mid 1970's, he was the only North American with extensive contacts and collaborations in continental Europe.

His work on evolution of cave animals was more than matched by his work on the taxonomy of cave animals. There are approximately 60 species of cave Collembola known from U.S. caves and he described nearly 50 of them! During the course of his career, he described species from all the major genera of Collembola occupy-

ing North American caves—*Onychiurus* (Pomorski et al. 2009), *Pseudosinella* [Christiansen 1960b, 1983; Christiansen and Luther 1986; Christiansen and Moberg 1988; Christiansen and Bellinger 1996b), *Pygmarrhopalites* (Christiansen 1966; Christiansen and Bellinger 1996a; Zeppelini and Christiansen 2003), *Sinella* (Christiansen 1960c), and *Tomocerus* (Christiansen 1964a).

Ken did not limit himself to the taxonomy of cave Collembola. He also described a number of non-cave dwelling species from the U.S. (Christiansen 1956b, 1958d; Christiansen and Bellinger 1973; Christiansen and Tucker 1977), Hungary (Wang et al. 2002c), Ascension Island (Christiansen 1998b), Lebanon and Syria (Christiansen 1956c, 1957, 1958b), Chile (Christiansen 1963), Mexico (Christiansen et al. 1985), and even fossil Collembola (Christiansen 1971d; Christiansen and Pike 2002). Among his international works, that in China stands out. Following at stint as a Visiting Professor at Nanjing University in 1990, he wrote more than 20 papers with Chinese colleagues on the Collembola of China [Chen and Christiansen 1993, 1996, 1997, 1998, 2004; Wu and Christiansen 1997; Ma and Christiansen 1998; Li and Christiansen 1997; Wang and Christiansen 2000; Wang et al. 2002a, 2002b, 2002d, 2003a, 2003b, 2003c, 2003d, 2003e; Chen et al. 2002; Jia et al. 2003; Ma et al. 2003, 2004; Madele et al. 2004). With Peter Bellinger, he wrote two editions of the “The Collembola of North America north of the Rio Grande”, a four volume work which is more than 1500 pages in length (Christiansen and Bellinger 1980–1981, 1998).

During his six decades at Grinnell, he introduced countless students to caves and cave biology, often in Hunter Cave. He introduced a number of students to research, and was an enthusiastic mentor to even the most unprepared student. Several of his students went on to get Ph.D’s and pursue research careers in ecology and evolutionary biology, including David Culver, Richard Seifert, and Mary Willson. He was also collaborator, mentor, and friend to generations of collembologists, and co-wrote papers with a number of colleagues, including Bellinger, Chen, Culver, de Gama, Li, Palacios-Vargas, Wang, and Zeppelini.

For anyone who has met Ken, a recitation of his academic achievements does not do justice to his influence or his character. Ken was enthusiastic in his support both of intellectual areas of interest, like cave biology and Collembola, and in those of us who shared these interests. Ken never claimed priority or seniority; he was the ideal colleague and mentor. He had an overall joie de vivre which infected those who came in contact with him. He had numerous interests outside of science, including acting in community theater, listening to opera, making wine, and studying history, especially military history. His enthusiasms and overall attitude are all the more remarkable for the many traumatic experiences in his wartime years, in a unit with high mortality. Without complaint or self pity, he kept these stresses and strains under control, with the support and understanding of his loving wife, Phyllis. I had the great fortune to be his student, colleague, and friend for more than 50 years. No one had a greater influence on me as a scientist or a person, and I am grateful to have known him. I am certainly not alone in this, and a little bit of Ken lives on in the best of each of us who knew him.

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